Chhetri Academy

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GCSE COMPUTER SCIENCE

4.1

Edexcel 1CP2 | Specification point 4.1.2

Different types of networks (LAN, WAN)

Untiered

Past paper question booklet

5	2016-2025	Untiered
question groups	available papers	tier

Before you begin

1. Show working and use units where appropriate.
2. Use extra paper if you need more space.
3. Print at actual size (100%) for measurement questions.

Name _____ **Date** _____

Whole questions are retained for context; some parts cover other points. Legacy sources are labelled.

1 (a) Computer networks are valuable to many businesses and individuals.

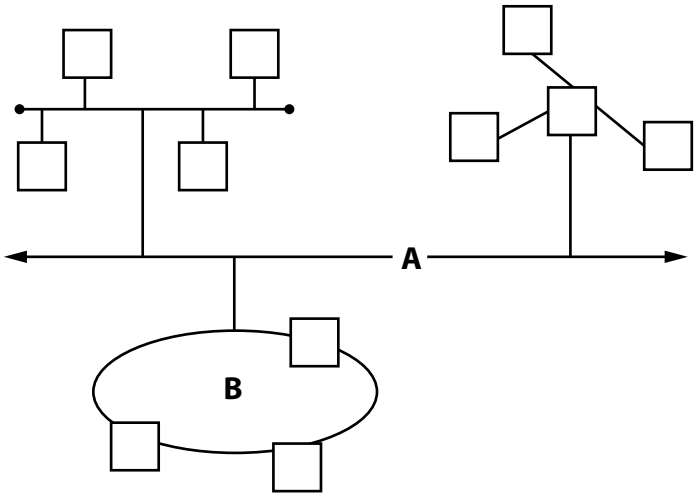
(i) State the purpose of network protocols.

(1)

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.....

Here is a diagram showing the Internet as a network of networks. Each square represents a computing device.



(ii) State the name of the high-speed Internet infrastructure shown at **A**.

(1)

.....

(iii) State the name of the network topology shown at **B**.

(1)

.....

(iv) Identify the type of network used in each situation.

(4)

Situation	LAN	WAN	PAN	VPN
A delivery driver uses a hands-free car kit to connect to his mobile phone.	☒	☒	☒	☒
A dental nurse uses a computer to look at digital x-rays stored on a server in the basement of the building.	☒	☒	☒	☒
A manager, working from home, is able to access all the computers in his company as if he was in the company office.	☒	☒	☒	☒
An office in Tokyo sends emails to all customers, whether they are in New York, Paris or Delhi.	☒	☒	☒	☒

(b) Data transmitted over a network is sometimes encrypted.

(i) State **one** reason why data encryption is used on a network.

(1)

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(ii) Complete the table using a Caesar cipher to encrypt and decrypt the text.

(2)

Plain text	Shift	Cipher text
d i g i t	+3	
	–2	z g l y p w

(c) Binary numbers are used to represent data in programs.

(i) Complete the table by adding these two positive 8-bit binary integers.

(1)

0	1	1	1	0	0	1	0
0	0	1	0	0	0	1	1

(ii) Convert the 8-bit binary 01101110 to hexadecimal.

(1)

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(iii) Convert the hexadecimal number C4 to 8-bit binary.

(1)

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(iv) Write an arithmetic expression to show that 256 different numbers can be represented in 8 bits.

(1)

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(d) (i) State **one** characteristic of a lossy compression algorithm.

(1)

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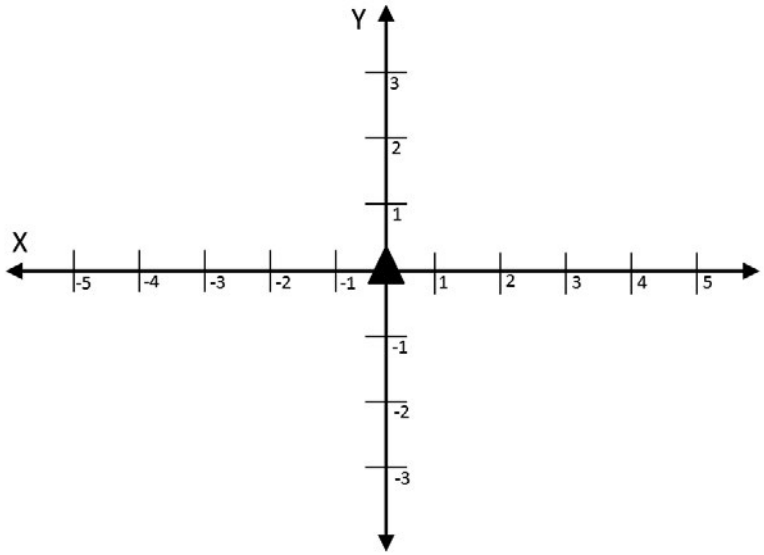
(ii) Identify an example of lossy compression.

(1)

- ☒ **A** GIF
- ☒ **B** JPEG
- ☒ **C** ZIP
- ☒ **D** TIFF

(e) Binary digits can represent Cartesian coordinates.

A turtle is used to draw on a Cartesian coordinate system. The turtle begins at the origin.



The turtle follows this program.

```
FORWARD 3
TURN RIGHT 90
FORWARD 5
TURN LEFT 180
FORWARD 3
```

Write the final location of the turtle using Cartesian coordinates.

(2)

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(Total for Question 1 = 18 marks)

7 A company moves its business online.

(a) Identify **one** way in which a WAN differs from a LAN.

(1)

- ☒ **A** LANs do not transmit data in packets
- ☒ **B** LANs use fibre optic cables
- ☒ **C** WANs are always connected via gateways
- ☒ **D** WANs are always wireless

(b) An employee accesses her work email using a smartphone and a laptop.

Explain why the IMAP protocol is more suitable for this than the POP3 protocol.

(2)

(c) Describe the role of the transmission control protocol (TCP).

(4)

(d) Describe the role of a server in a client-server network.

(2)

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(e) Draw lines to show how all these devices would be connected using a bus topology.

(2)









(Total for Question 7 = 11 marks)

1 Networks

(a) Devices are connected to networks.

(i) Give **two** reasons for connecting computers in a network.

(2)

1 .....

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2 .....

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(ii) Describe **one** way a local area network (LAN) is different from a wide area network (WAN).

(2)

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(iii) A network has a speed of 17.08 megabits per second.

Identify the equivalent speed in bits per second.

(1)

☒ **A** 17 080

☒ **B** 17 080 000

☒ **C** 17 080 000 000

☒ **D** 17 080 000 000 000

(iv) Define the term 'latency'.

(1)

(b) Data is split up into packets for transmission over a network.

(i) Each device on a network has a unique identifier that is used when sending or receiving packets of data.

State the name of the unique identifier.

(1)

(ii) Identify the item included between the header and the footer in a data packet.

(1)

- ☒ **A** Data being sent
- ☒ **B** Destination address
- ☒ **C** Packet number
- ☒ **D** Public key

(c) Describe how a firewall protects a local area network (LAN).

(2)

(d) State the name of an email protocol.

(1)

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(e) Explain **one** disadvantage of using a star network topology.

(2)

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(Total for Question 1 = 13 marks)

3 Networks

(a) Networks are described in many different ways.

(i) Give the type of network that covers a small geographical area.

(1)

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(ii) Name the characteristic of a wireless network that is measured in metres.

(1)

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(iii) Give **two disadvantages** of a bus network topology.

(2)

1 .....

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2 .....

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(b) Describe penetration testing.

(2)

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(c) Network protocols control the rules of communication.

(i) Name a network protocol that transmissions from other electrical devices can interfere with and that can be blocked by walls.

(1)

(ii) Name the network protocol used to download a music file from a server.

(1)

(d) Describe how the link layer of the TCP/IP protocol stack works.

(2)

(e) Construct an expression to calculate the transmission rate, in megabits per second, required to transmit a 1.4 gibibyte file in 13 minutes.

You do not need to do the calculation.

(4)

(Total for Question 3 = 14 marks)

4 Networks

(a) A business has one office in New York and one in London.

State the type of network needed to connect the two offices.

(1)

(b) Network protocols govern how data is transmitted between devices.

Complete the table with the network protocol for **each** description.

(3)

Description	Network protocol
Allows two computers to establish a connection across a network	
Allows connection to a network using radio waves	
Allows upload and download of files across a network	

(c) Describe the role of an ethical hacker in network security.

(3)

(d) A business employs 20 people.

Each employee has a laptop.

The business is relocating to a new office building.

Employees need to access resources and connect to the internet.

Discuss the type of network the business should install in its new building.

Your answer should consider:

- transmission media
- network topology.

You do not need to consider cost of materials or installation.

(6)

(Total for Question 4 = 13 marks)